USGS

WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2002PA2B

Title: Resuspension of Bottom Sediments by Recreational Watercraft

Project Type: Research

Focus Categories: Sediments, Management and Planning, Water Quality

Keywords: boating, fluid mechanics, lakes, nutrients, reservoir management, suspended sediments, water quality management

Start Date: 03/01/2002

End Date: 12/31/2002

Federal Funds Requested: $14,150

Non-Federal Matching Funds Requested: $28,829

Congressional District: 5th of PA

Principal Investigator:
David F. Hill
Penn State University

Abstract

The current proposal seeks funds to conduct a study of the impact of recreational watercraft traffic on water quality and clarity in shallow lakes. Of particular interest is a solid understanding of the hydrodynamic processes involved. Sediment resuspension, which can lead to increased turbidity and elevated levels of nutrients, such as phosphorous, and pollutants trapped in the sediment, has two sources related to watercraft use. The first is the direct interaction of turbulent prop or jet wash on the water-sediment interface. The second is the shoaling of wakes as they propagate into shallow regions of the lakes. The current study will focus solely on resuspension due to prop wash.

The main goal of this study is to be able to predict the onset of sediment motion as a function of boat speed, type, horsepower, as well as water depth. The second goal of this study is to begin to develop a model which, based upon statistical information on the boat densities and use patterns, sediment characteristics, and bathymetry of a specific lake, will be able to estimate the total suspended sediment load due to the boat traffic. The final product, therefore, will be a management tool which can be used to determine if, where, and when restrictions on boat power, speed, and operating depth are appropriate.